PEACE/WILLISTON
FISH & WILDLIFE
COMPENSATION
PROGRAM

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BRITISH
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A Reconnaissance Survey Of Monk Lake

M. J. Hunter
March 1997

PWFWCP Report No. 169

The Peace/Williston Fish & Wildlife Compensation Program is a cooperative venture of BC Hydro and the provincial fish and wildlife management agencies, supported by funding from BC Hydro. The Program was established to enhance and protect fish and wildlife resources affected by the construction of the W.A.C. Bennett and Peace Canyon dams on the Peace River, and the subsequent creation of the Williston and Dinosaur Reservoirs.

Peace/Williston Fish and Wildlife Compensation Program, 1011 Fourth Ave. 3rd Floor, Prince George B.C. V2L 3H9

Website: *www.bchydro.bc.ca/environment/initiatives/pwcp/*

This report has been approved by the Peace/Williston Fish and Wildlife Compensation Program Fish Technical Committee.

Citation: M. J. Hunter March 1997. A reconnaissance survey of Monk Lake. Peace/Williston Fish and Wildlife Compensation Program, Report No. 169. 21pp plus appendices.

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105-02084/

A RECONNAISSANCE SURVEY OF

MONK LAKE

WATERSHED:	**Williston Reservoir (Parsnip Reach)**
DATE OF SURVEY:	**October 10 - 11, 1996**
FIELD CREW LEADER:	**Mark Hunter**
FIELD ASSISTANT:	**Karin Mathias**
REPORT PREPARED BY:	**Mark Hunter**

BRITISH COLUMBIA CONSERVATION FOUNDATION

PEACE / WILLISTON FISH AND WILDLIFE COMPENSATION PROGRAM

B. C. MINISTRY OF ENVIRONMENT, LANDS AND PARKS

FUNDED BY: FOREST RENEWAL BRITISH COLUMBIA

RELEASED BY: _____

D. J. Cadden, Regional Fisheries Biologist

LAKE: Monk Lake **SYSTEM NAME:** McLeod River

A.S.A.P. REFERENCE NO.: **WATERSHED CODE: 230-9068-556-242**

DATA ON FILE FOR THIS SURVEY

Location	X	Dissolved 02 / Temp. Profiles	X
Physical Data	X	Winter Dissolved 02 / Temp. Profiles	--
Bench Mark	X	Netting Record	X
Terrain Features	X	Lake Catch Summary	X
Access	X	Individual Fish Data	--
Resorts and Campsites	X	Fish Preserved	--
Other Developments	X	Stomach Analysis	--
Obstructions and Pollutions	X	Scale Reading	--
Special Restrictions	X	Location of Inventory Sites	X
Aquatic Plants	X	Photograph Directory	X
Wildlife Observations	X	Appendices	
Miscellaneous Comments	X	A: Water Chemistry Analysis	X
Lake Drainage	X	B: Tributary Stream Data	--
Fisheries Management Comments	X	C: Fish Scale Analysis	--
History of Previous Surveys	X	Bathymetric Map Reduction	--
Water Chemistry Summary	X	Bathymetric Map	--

LOCATION

Location:	approximately 46 km south-southwest of Mackenzie		
Elevation:	900 m ± 15 m	U.T.M.:	10.483878.6087765
Latitude / Longitude:	$54^0$56'12" $123^0$15'06"	N.T.S. Map No.:	93 - J / 14
Management Unit:	7-24	Biogeoclimatic Zone:	Sub-Boreal Spruce
Ecoprovince:	Sub-Boreal Interior	Ecoregion:	Fraser Basin
Ecosection:	Nechako Lowlands		

Drainage: Moffat C. --> McLeod R. --> McLeod L. --> Pack R. --> Williston Reservoir (Parsnip Reach) --> Peace R.

PHYSICAL DATA

Lake Drainage Area:	0.3 km^2	Volume:	106 024 m^3
Water Surface Area:	24 518 m^2	Perimeter of Islands:	0 m
Area Above 6 m Contour:	16 477 m^2	Number of Islands:	0
Shoreline Perimeter:	816 m	Mean Depth:	4.4 m
Maximum Depth:	13.1 m	Secchi Reading:	4.6 m
Filterable Residue (TDS):	50 mg/L		

Sounding Device: Lowrance X-15 Elevation Source: Contour Interpolation

BENCHMARK

(Iron spike, center of red circle) located 2.0 m above present water level in a 36 cm diameter spruce tree that is 2.78 m from the present water's edge and located on the west-southwest side of the lake almost directly across from beaver hut # 1 and south of beaver hut # 2 (Plate # 4).

High Water Mark: 0.10 m above water level at time of survey

~40 km to Mackenzie
93-2/4
McDougall
McLeod
FOREST
N E C H A K O
Bonnington

LAKE: Monk Lake

TERRAIN FEATURES

Immediate Shoreline:

The east and west sides of Monk Lake are fronted by a growth of sedge grasses with alders back from the lake, and spruce and lodgepole pine trees growing behind on steep slopes. The north end of the lake is dominated by a sedge grass marsh, and the south end of Monk Lake is dominated by a sedge grass swamp. The shoreline substrate on all sides of the lake is composed of silts and organics with aquatic moss covering some areas. Along the marsh in the north end of the lake, there is a 1.5 m vertical drop off from the edge of the marsh to the lake's bottom. which then has a low slope towards the center of the lake. On the other three sides of Monk Lake, there is a low slope from the lake's edge towards the lake's bottom. There is some large woody debris fallen into the lake along the east and west sides. As well, there are two beaver huts on Monk Lake; there is one located in the middle of both the east and west sides of the lake (Plates # 5 & # 6).

Surrounding Country:

A mature forest of spruce and lodgepole pine trees, with some fir trees intermixed, surrounds Monk Lake. Once out of the bowl that Monk Lake is in, the surrounding terrain to the north, east and west is rolling hills. Behind the large swamp of sedge grasses, alders and willows located south of Monk Lake, the forest grows on low, flat ground. Monk Lake is situated within the Sub-Boreal Spruce biogeoclimatic zone.

LAKE: Monk Lake

ACCESS

Directions:

From it's junction with Highway 39, drive south on Highway 97 for approximately 1.5 km and turn right on to the Finlay Forest Service Road. Travel north for approximately 12 km, then turn left on to the Tudyah Main Line and proceed for approximately 2 km. Turn right on to the Sabai Main Line and drive for approximately 3 km, then turn left. Proceed along the Holder Main Line for approximately 13.25 km. Turn left on to a side road and drive approximately 2 km to a clear cut. The total distance from the junction of Highway 97 and Highway 39 to the clear cut is approximately 33.75 km From the clear cut, Monk Lake is approximately a 9.5 km helicopter ride to the west-southwest.

Road Type and Conditions:

Highway 97 is a well-maintained, two-lane paved highway. The Finlay Forest Service Road and all three Main Lines are well-maintained, two-lane gravel logging roads that can easily be traveled with a two-wheel drive vehicle. The Side road that leads to the clear cut is a maintained, one-lane gravel logging road that can be easily traveled with a two-wheel drive truck.

Restrictions:

Although there are no restrictions, it is recommended that a truck radio be used when traveling the Forest Service Road and the logging roads.

LAKE: Monk Lake

RESORTS AND CAMPSITES

There are no resorts or campsites on Monk Lake.

OTHER DEVELOPMENTS

None noted.

OBSTRUCTIONS AND POLLUTIONS

None noted.

SPECIAL RESTRICTIONS

None known.

AQUATIC PLANTS

The following aquatic plants were identified during the time of the survey:

eel grass
sedge grasses
aquatic moss

WILDLIFE OBSERVATIONS

The following wildlife or signs were seen during the time of the survey:

moose tracks
unidentified frogs

MISCELLANEOUS COMMENTS

1) A helicopter can be landed on the marsh located on the north end of Monk Lake. This is also a good location for launching a boat.

2) Bathymetric map: The lake outline was drawn from an enlargement of air photo 30 BCB 94067: No. 062, flown August 28, 1994.

LAKE: Monk Lake

LAKE DRAINAGE

General:

There are no permanent inlets that feed into Monk Lake - the lake is fed by snow melt and rain gathered off the immediate hills that surround the lake. Monk Lake is drained to the south by Moffat Creek, which runs for approximately 4.7 km to its confluence with the McLeod River.

Major Systems:

There are no major systems.

Minor Systems:

Outlet - Moffat Creek

Monk Lake is drained from the south end of the lake by Moffat Creek (Plate # 7). Over the first 40 m downstream of the lake, the channel is braided through a sedge grass swamp. Approximately 40 m downstream of the lake, there is a 0.5 m high beaver dam that is overgrown with grasses and willows (Plate # 8). The dam was probably not passable to upstream fish movement at the time of the survey due to lack of sufficient flow over the top of the dam. Approximately 50 m downstream of Monk Lake, there is a second beaver dam that is 0.15 m high. Approximately 85 m downstream of the lake, there is a third beaver dam that is 1.0 m high. As with the first beaver dam, this dam was probably not passable to upstream fish movement at the time of the survey due to lack of sufficient flow over the top of the dam. The substrate over this entire stretch of the creek is composed of silts and organics. Over the next 200 m, Moffat Creek continues to flow through the sedge grass swamp. As well, there are numerous small beaver dams located along the length of the creek surveyed. In the section surveyed, Moffat Creek had no fisheries potential during the survey period.

LAKE: Monk Lake

FISHERIES MANAGEMENT COMMENTS

Monk Lake appeared to be barren of all fish species. No fish were caught in four Gee minnow traps and one experimental monofilament gill net set overnight. This could be due to the fact that there were no gravels located in Moffat Creek (the outlet) over the first 285 m downstream of the lake, and this appeared to be the case for a much greater distance as the swamp continued for another few hundred meters. There were aquatic organisms suitable for salmonid consumption, such as leeches, dragonfly nymphs and water beetles, found in the lake. Monk Lake is 13.15 m deep and the fall oxygen / temperature profile indicates that there would be enough dissolved oxygen to support a fish population. As well, the pH averaged 6.85 (field) from top to bottom, which is also suitable for sustaining a fish population. If Monk Lake was stocked, a non-breeding population of rainbow trout, such as all-female Pennask rainbow trout, could be used with continuous restocking, or rainbow trout could be transplanted from McLeod River so that new genes are not introduced artificially into the system. If rainbow trout are transplanted from McLeod River, placing some spawning gravel in the outlet creek may make the population in the lake self-sustaining.

HISTORY OF PREVIOUS SURVEYS

Lake Surveys:

None known.

Other Related Studies:

None known.

LAKE: Monk Lake

WATER CHEMISTRY SUMMARY Limnology Station No. 1

Field Conditions:

Date:	October 10, 1996		
Time:	1530 hrs	Air Temperature:	13.0 °C
Wind Velocity:	1 - 2 km/h	Wind Direction:	from the S
Cloud Cover:	10 / 10 o.c.	Surface Conditions:	small ripples
Secchi Disc:	4.6 m	Water Colour:	clear with tannic colour

Method Used:

Dissolved Oxygen:	YSI Model 57 Oxygen / Temperature Meter
Water Temperature:	YSI Model 57 Oxygen / Temperature Meter
Air Temperature:	Hand-Held Alcohol Thermometer
pH (field):	Digital pH Pocket Tester
H2S (fieid):	Hach H2S Field Test Kit
Laboratory Used:	Pacific Environmental Science Center
Water Sampler:	Vertical Alpha Water Bottle (Vandorn)
Metal Sampler:	By Hand; Preserved With 2.0 mL Nitric Acid
Substrate Sampler:	Substrate Sample Not Taken

Water Sample Chemistry: **SEAM Site No.:** E 223165

	Sampling Depths	
	Surface (0.5 m)	Lower (12.0 m)
Alkalinity (lab)	30.2 mg / L	89.3 mg / L
Filterable Residue 105°C (lab)	50 mg / L	140 mg / L
H2S (field)	N/A	0.3 mg / L
Nitrogen - Total (lab)	0.39 mg / L	4.9 mg / L
Non-Filterable Residue (lab)	< 5 mg / L	20 mg / L
pH (field)	6.9	6.8
pH (lab)	7.09	6.43
Phosphorus - Total Dissolved (lab)	0.004 mg / L	0.46 mg / L
Specific Conductance (lab)	64 µS / cm	181 µS / cm

Bottom Depth: 13.1 m

Substrate Sample Depth: N/A

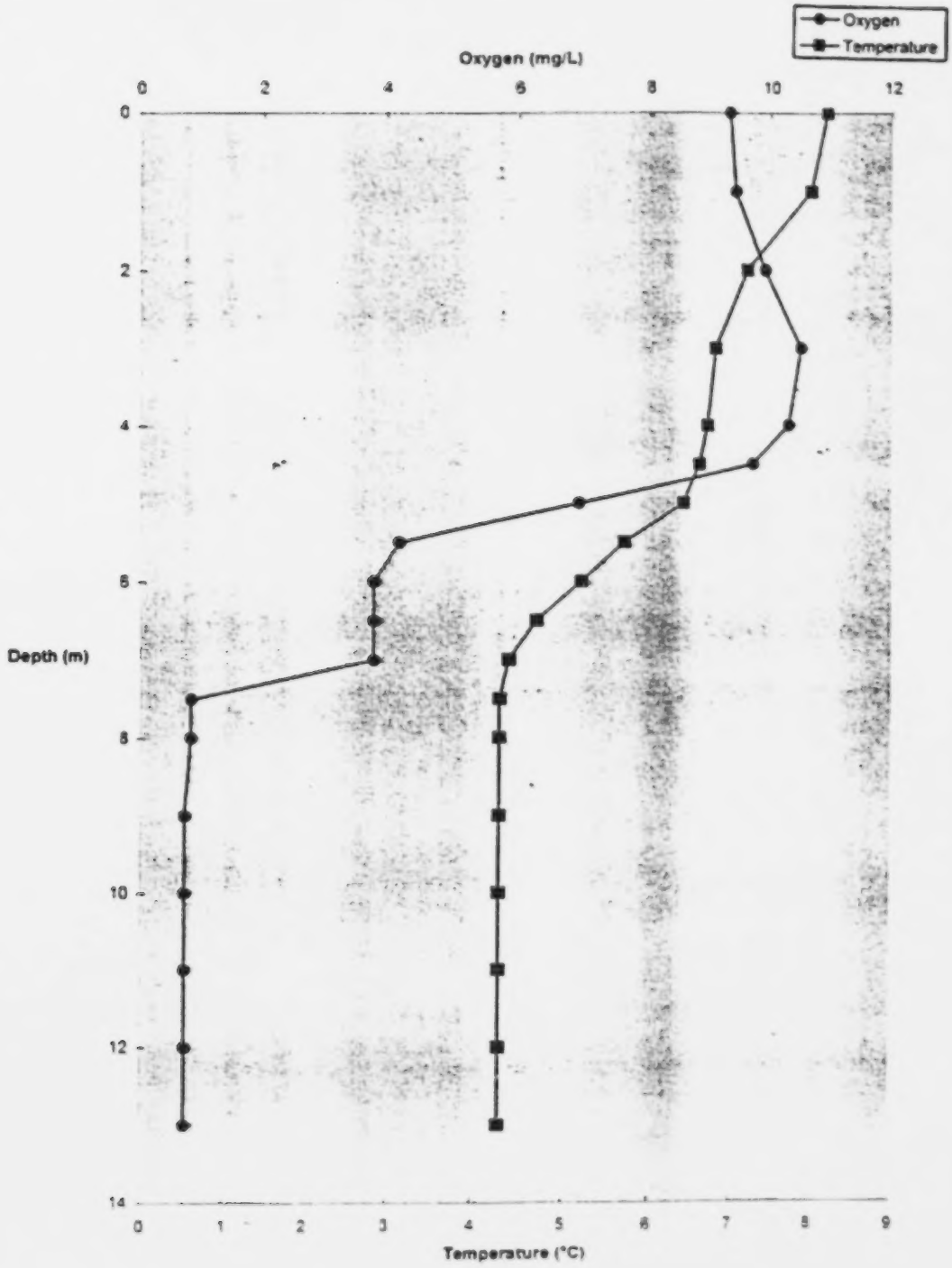
* additional analyzed parameters and results, including metals, are found in Appendix 1

LAKE: Monk Lake

FALL OXYGEN / TEMPERATURE DATA

DEPTH (m)	02 (mg/L)	TEMPERATURE (°C)
Surface	9.3	8.2
1.0	9.4	8.0
2.0	9.9	7.2
3.0	10.5	6.8
4.0	10.3	6.7
4.5	9.7	6.6
5.0	6.9	6.4
5.5	4.2	5.7
6.0	3.8	5.2
6.5	3.8	4.7
7.0	3.8	4.4
7.5	0.8	4.3
8.0	0.8	4.3
9.0	0.7	4.3
10.0	0.7	4.3
11.0	0.7	4.3
12.0	0.7	4.3
13.0	0.7	4.3
13.15	Bottom	

FALL OXYGEN / TEMPERATURE PROFILE



LAKE: Monk Lake

NETTING RECORD

Mesh Size Experimental Order: 25, 76, 51, 89, 38, 64 mm

NETTING SITE # 1

Type:	Sinking Monofilament Gill Net			
Date Set:	October 10, 1996		Time:	1657 hrs
Date Lifted:	October 11, 1996		Time:	0913 hrs
Net Dimensions:	Length:	91.4 m	Depth:	2.4 m
Shallow End Mesh Size:	25 mm		Depth:	1.4 m
			Substrate:	silt / organics
Deep End Mesh Size:	64 mm		Depth:	0 m
			Substrate:	silt / organics

Comments: The net started approximately 5.0 m from the shore. Because Monk Lake was so small, the net ended on the opposite side of the lake. The net was empty.

LAKE CATCH SUMMARY

Minnow Traps:

Bait: Sardines

Trap No.	Hours	Depth (m)	Substrate	Species	No. Caught	Size Range (cm)
1	16:05	1.1	aquatic moss over silt	empty	0	-
2	16:08	1.1	aquatic moss over silt	beetle leech frog	5 2 1	-
3	16:10	1.1	aquatic moss over silt	beetle dragonfly nymph	5 1	-
4	16:14	1.6	aquatic moss over silt	beetle leech	5 1	-

LS
1
NS
1
2
3
1
LOCATION OF INVENTORY SITES
Benchmark
Stream Number And Direction Of Flow
Net Set Number And Site
Limnostation Number And Site
Plate Number And Direction Of Photograph

LAKE: Monk Lake

PHOTOGRAPH DIRECTORY

Plate	Roll : Number	Description
1	36: 3	Aerial view of Monk Lake looking north.
2	37:11 - 13	Panoramic view of Monk Lake looking north from the center of the lake.
3	37:14 - 16	Panoramic view of Monk Lake looking south from the center of the lake.
4	37: 20	View of the benchmark located 2.0 m above present water level in a 36 cm diameter spruce tree that is 2.78 m from the present water's edge and located on the west-southwest side of the lake almost directly across from beaver hut # 1 and south of beaver but # 2.
5	37: 18	View of beaver hut # 1 located in the middle of the east side of Monk Lake.
6	37: 19	View of beaver hut # 2 located in the middle of the west shore of Monk Lake.
7	37: 17	View of the mouth of Moffat Creek (the Outlet) where it drains Monk Lake from the south end of the lake.
8	37: 23	Upstream view of beaver dam # 1 on Moffat Creek, located approximately 40 m downstream of Monk Lake.

LAKE: Monk Lake

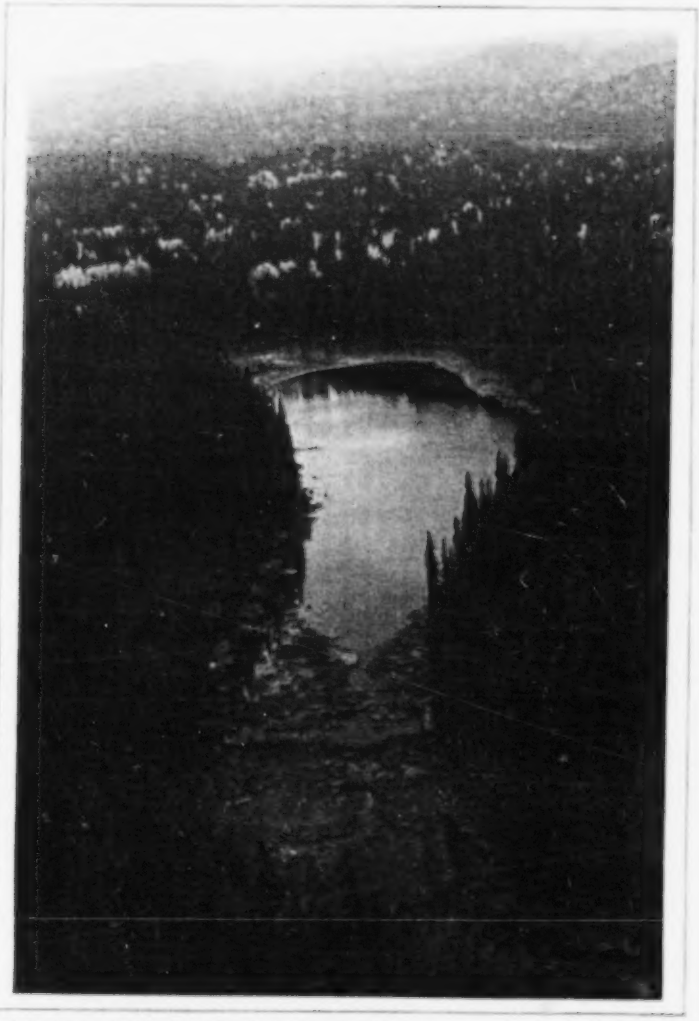


Plate # 1: Aerial view of Monk Lake looking north

LAKE: Monk Lake

Plate # 2: Panoramic view of Monk Lake looking north from the center of the lake.

LAKE: Monk Lake

Plate # 3: Panoramic view of Monk Lake looking south from the center of the lake.

LAKE: Monk Lake

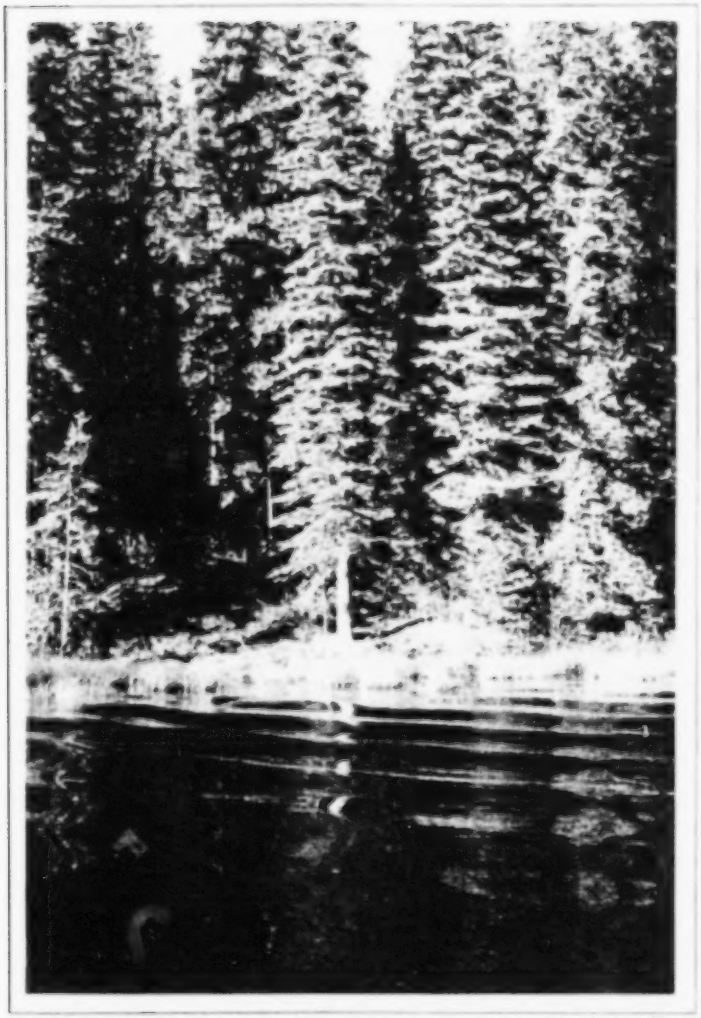


Plate # 4: View of the benchmark located 2.0 m above present water level in a 36 cm diameter spruce tree that is 2.78 m from the present water's edge and located on the west-southwest side of the lake almost directly across from beaver but # I and south of beaver but # 2.

LAKE: Monk Lake

Plate # 5: View of beaver but # 1 located in the middle of the east side of Monk Lake.

Plate # 6: View of beaver hut # 2 located in the middle of the west side of Monk Lake

LAKE: Monk Lake

Plate # 7: View of the mouth of Moffat Creek (the Outlet) where it drains Monk Lake from the south end of the lake.

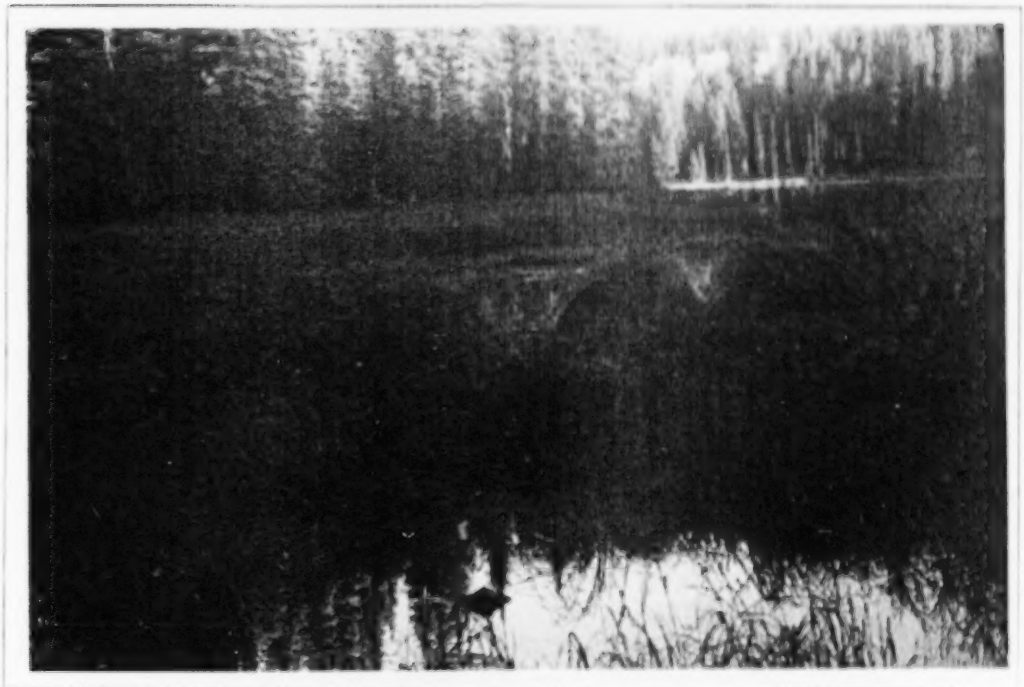


Plate # 8: Upstream view of beaver dam # on Moffat Creek, located approximately 40 m downstream of Monk Lake

Plate # 9: Upstream view of beaver dam # 2 on Moffat Creek, located approximately 50 m downstream of Monk Lake.

Plate # 10: Upstream view of beaver dam # 3 on Moffat Creek, located approximately 85 ni downstream of Monk Lake.

Appendix A

LABORATORY REPORT

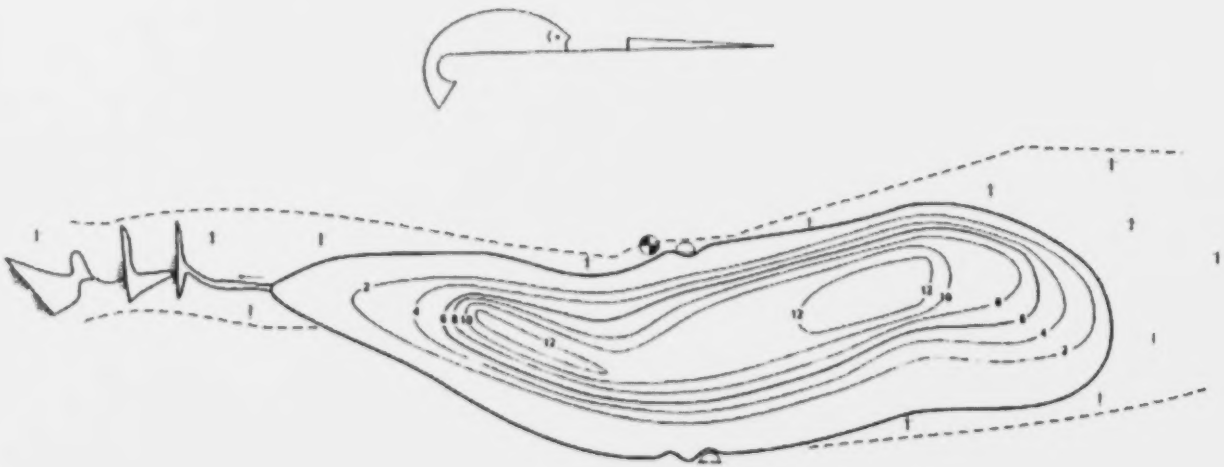
Water Chemistry Analysis

RESULTS FOR MONK LAKE SAMPLES

Parameter Analyzed		Units	965642-001	965642-002
SALINITY		mg/l	30.2	89.3
CONDUCTIVITY		uS/cm	64	181
METALS/TOTAL (WATER-ICP)	AG	mg/l	<.01	-
	AL	mg/l	<.06	-
	AS	mg/l	<.06	-
	B	mg/l	<.01	-
	BA	mg/l	.014	-
	BE	mg/l	<.001	-
	CA	mg/l	9.5	-
	CD	mg/l	<.006	-
	CO	mg/l	<.006	-
	CR	mg/l	<.006	-
	CU	mg/l	<.006	-
	FE	mg/l	.086	-
	K	mg/l	.3	-
	MG	mg/l	1.8	-
	MN	mg/l	.026	-
	MO	mg/l	<.01	-
	NA	mg/l	1	-
	NI	mg/l	<.02	-
	P	mg/l	<.1	-
	PB	mg/l	<.06	-
	SB	mg/l	<.06	-
	SE	mg/l	<.06	-
	SI	mg/l	.91	-
	SN	mg/l	<.06	-
	SR	mg/l	.046	-
	TI	mg/l	<.002	-
	V	mg/l	<.01	-
	ZN	mg/l	.003	-
NITROGEN/AMMONIA		mg/l	.031	3.57
/NITRITE+NITRATE		mg/l	<.002	.004
/TOTAL		mg/l	.39	4.9
PH		Rel.U.	7.09	6.43
PHOSPHORUS/O-PO4		mg/l	<.001	.469
/TOTAL		mg/l	.008	0.81
/TOTAL DISSOLVED		mg/l	.004	.46
RESIDUE/FILTERABLE		mg/l	50	140
/NON-FILTERABLE		mg/l	<5	20
BC CLIENT STUDY CODE			20	20
SAMPLING AGENCY		EMScode	91	91
SITE IDENTIFIER/NUMBER			E223165	E223165
COLLECTION START DATE		y/m/d	96/10/10	96/10/10
UPPER DEPTH		metres	0.5	12.0
TEMPERATURE ON ARRIVAL		deg.C	8	8

Appendix B

BATHYMETRIC MAP



Reduced to
34%
of Original Size

NOTES: 1 - Depths are in Metres, 2 - Denotes Bench Mark. 3 - Was extended for navigational use. Uncharted rocks and shoals may exist.

SURVEYED BY M Hunter E Mathias DATE Oct 10 11 1996
OUTLINE SOURCE Air Photo NRC B90067 062 July 10 94

PREPARED FOR: Ministry of Environment, Lands and Parks
BY Jordan Pelton
B.C. Conservation Foundation

STATISTICS AT TIME OF SURVEY

Elevation	899	m
Surface Area	21883	sq.m
Area above low summer	13822	sq.m
Volume	106029	cu.m
Mean Depth	4.8	m
Maximum Depth	13.1	m
Perimeter, Main Shore	810	m
Perimeter, Islands	0	m
Bench Mark	2.0	m

Monk Lake

DIGITIZED FROM 1:20 000 TRIM		UTM COORDINATE ZONE 10
NAD 1927	PLOT DATE Jan 15, 1997	SCALE 1:2000
DIGITIZED Completed	REVISION DATE	
CONTOURS 1 M.I.	APPROVED Ron Cobbe	MAP NO. 92E/14
TECH. LINES		